LAKE WINNIPEG COMMUNITY-BASED MONITORING NETWORK

East Interlake Conservation District

2018 Regional Report

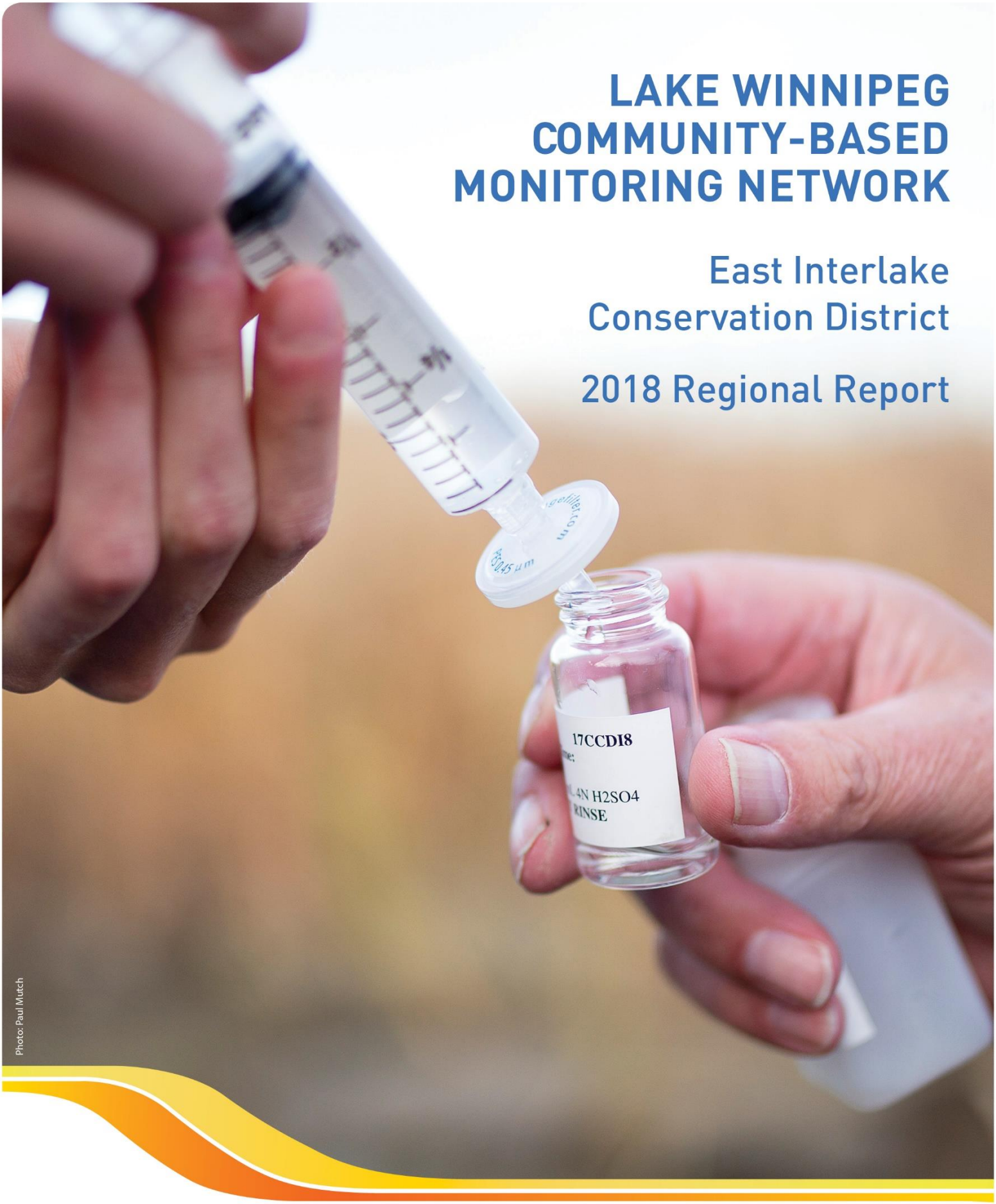

Photo: Paul Mutch

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LAKE WINNIPEG COMMUNITY-BASED MONITORING NETWORK: OVERVIEW

Lake Winnipeg, the world's 10th largest freshwater lake, receives its water from a vast watershed – an area of land 40 times larger than the lake itself which includes many smaller sub-watersheds. All human activities across this huge watershed have the potential to impact our water quality. However, the closer you are to Lake Winnipeg, the bigger your impact will likely be.

Phosphorus is the nutrient responsible for the potentially harmful blue-green algae blooms on Lake Winnipeg and on other lakes within the watershed. Different sub-watersheds contribute different proportions of Lake Winnipeg's total phosphorus load. With the help of a strong network of local organizations and citizen scientists, the Lake Winnipeg Community-Based Monitoring Network (LWCBMN) is identifying phosphorus hotspots on the landscape, creating opportunities to target funding and action to achieve the greatest return on investment.

Snow melts, floods and heavy rainfall events are responsible for most of the phosphorus that is flushed from the land and carried into our waterways. LWCBMN samples frequently throughout the season, and particularly during the spring melt, to ensure we capture phosphorus runoff during these high-water events.

Most community-based monitoring (CBM) sampling is conducted at stations where water flow is continuously monitored by the Water Survey of Canada. By tracking flow online using the Water Survey of Canada's real-time data, the network can mobilize partners and citizen scientists across the watershed to ensure frequent sampling during peak flows. Sampling at these stations provides corresponding flow data, allowing CBM data to be used to calculate **phosphorus loads**. We need several samples throughout the season to accurately calculate these loads. Phosphorus loads can subsequently be used to calculate **phosphorus exports**, based on the area of the watershed.

Phosphorus load is the total amount of phosphorus flowing past a sample site over a given period of time.

Phosphorus export is the amount of phosphorus exported by each hectare of land in a year, expressed as kg/ha/y.

The network in action – 2018

In 2018, in its third field season, LWCBMN grew to cover more drainage areas across the province, collecting samples at new sites in the western Red River valley, along Winnipeg River tributaries and in the City of Winnipeg. A total of 1000 samples were collected from 101 sites.

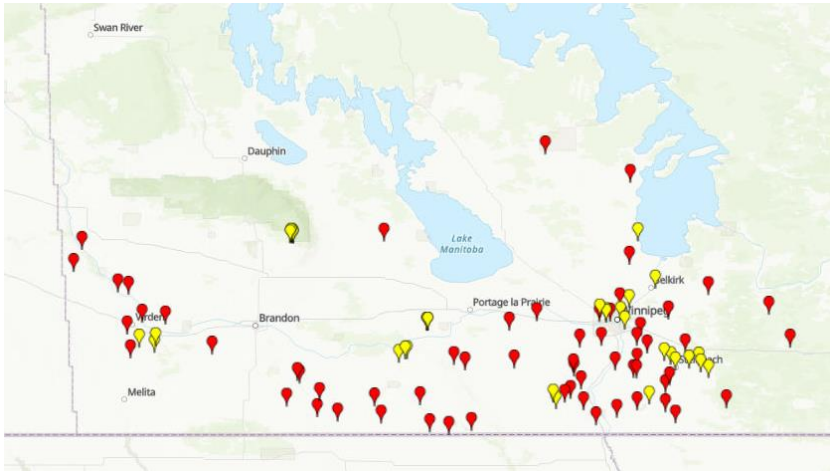


Figure 1. 2018 sample sites. Sites in red are located at Water Survey of Canada flow-metered stations. Sites in yellow are monitored by volunteer samplers where flow is not measured.

2018 RESULTS: OVERVIEW

Table 1. Overview of findings from 2018 LWCBMN phosphorus monitoring data.

REGION	# years of LWCBMN data	# sites in 2018	# samples collected in 2018	Highest phosphorus export in region (2017)	Highest phosphorus export in region (2018)	Regional lead
East Interlake Conservation District	2	4	74	0.33 kg/ha/y (Icelandic River)	0.03 kg/ha/y (Icelandic River and Grassmere Creek)	Armand Belanger (EICD)
Seine Rat River Conservation District	3	20	204	1.64 kg/ha/y (Manning Canal)	0.22 kg/ha/y (Main Drain near Dominion City)	Jodi Goerzen and Chris Randall (SRRCD)
La Salle Redboine Conservation District	3	12	139	0.76 kg/ha/y (La Salle River at Sanford)	0.12 kg/ha/y (Roseisle Creek near Roseisle)	Justin Reid (LSRBCD)
Upper Assiniboine River Conservation District	2	6	102	0.62 kg/ha/y (Arrow River)	0.08 kg/ha/y (Bailey's Creek near Oak Lake)	Ryan Canart (UARCD)
Pembina Valley Conservation District	2	12	102	1.88 kg/ha/y* (Pembina River near Windygates)	0.21 kg/ha/y (Long River near Holmfield)	Cliff Greenfield (PVCD) and Jason Vanrobaeys (AAFC)
West Souris River Conservation District	1	5	97	-	0.01 kg/ha/y (Pipestone Creek near Pipestone)	Dean Brooker and Scott Hainsworth (WSRCD)
City of Winnipeg	1	6	68	-	0.03 kg/ha/y (Omand's Creek near Empress Street)	Lake Winnipeg Foundation
Western Tributaries of Red River	1	5	27	-	0.11 kg/ha/y (Buffalo Creek near Rosenfeld)	Lake Winnipeg Foundation
Little Saskatchewan River Conservation District	1	6	47	-	No flow metered stations	Colleen Cuvelier (LSRCD)
Cooks Creek Conservation District	2	4	34	-	0.01 kg/ha/y (Cooks Creek below Diversion and at Diversion)	Lake Winnipeg Foundation

In the 2018 field season, southern Manitoba was very dry with low discharge at all sampling sites, resulting in low phosphorus exports and low spatial variation between sub-watersheds. The dry conditions in 2018 highlight the important relationship between water discharge and phosphorus load entering Lake Winnipeg: high water years are high phosphorus loading years and low water years are low phosphorus loading years. For example, the Manning Canal was a phosphorus hotspot in 2016 and 2017 with phosphorus exports of 1.10 kg/ha/y and 1.62 kg/ha/y respectively. In contrast, the Manning Canal had a phosphorus export of 0.07 kg/ha/y in 2018. Though peak phosphorus concentrations were similar in all three years, the water load was ten times lower in 2018 (Figure 2). **Results from the 2018 field season demonstrate that we can reduce the phosphorus entering our lakes by reducing water runoff across the watershed.**

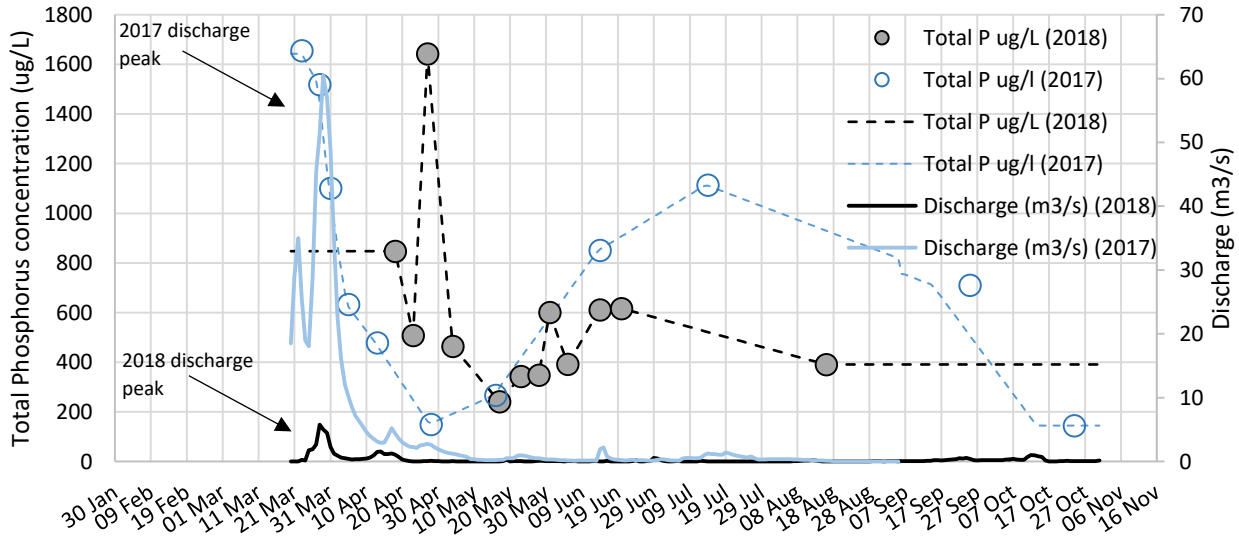


Figure 2. Comparison of phosphorus concentration and discharge in 2017 (blue) and 2018 (black) at the Manning Canal site.

EAST INTERLAKE CONSERVATION DISTRICT

The East Interlake Conservation District (EICD) is located west of Lake Winnipeg. EICD consists of four major sub-watersheds: Fisher River; Icelandic River and Washow Bay creek; Willow Creek; and Netley-Grassmere watersheds. The primary land use in EICD is agriculture, specifically livestock, hay production and annual cropland. In addition to agricultural activities, wastewater treatment plants and lagoons in municipalities throughout EICD contribute phosphorus to local waterways. Major municipalities include Gimli, Riverton, and Dunnottar.

In partnership with LWCBMN, EICD staff sampled Fisher River, Icelandic River, Netley Creek and Grassmere creek in 2018. EICD was able to collect samples frequently at all four sites, specifically during the spring runoff period, resulting in high-quality data that captured all discharge peaks. For all sample sites, most of the water (77%) and phosphorus (88%) contribution occurred during the spring, from March 1st to May 31st.

Table 2. Overview of findings from 2018 EICD sample sites.

Sampling station	Phosphorus load (tonnes/y)	Phosphorus export (kg/ha/y)
A. Fisher River	1	0.02
B. Icelandic River	4	0.03
C. Netley Creek	1	0.02
D. Grassmere Creek	1	0.03

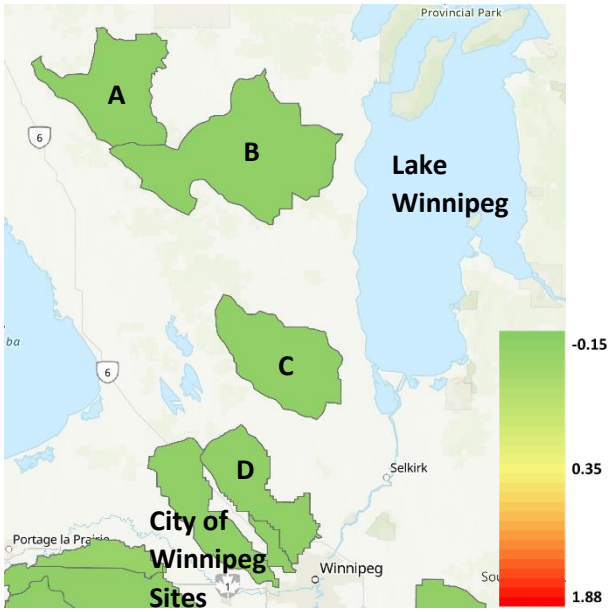
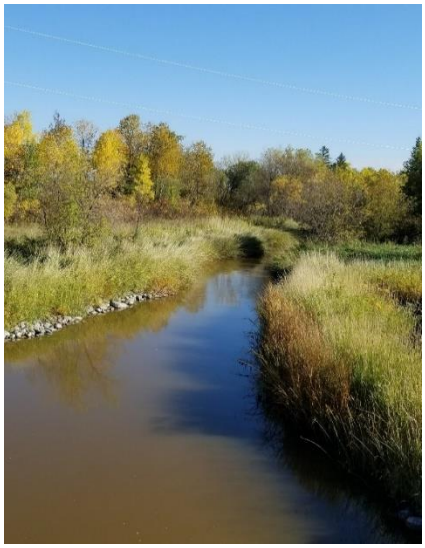


Figure 3. Phosphorus export (kg /ha/y) map for sub-watersheds in the East Interlake Conservation District.

2018 RESULTS BY SAMPLE SITE



Fisher River near Fisherton

Fisher River is the most northerly river sampled in EICD and flows north-easterly. The 601 km^2 area that drains into this site includes the Rural Municipality of Fisherton and is less densely agricultural compared to the other EICD sites. The Fisher River watershed contains many natural habitats such as forests, wetlands and peat bogs (Fisher River Integrated Watershed Management Plan, 2011).

This sample site is located at Water Survey of Canada flow meter 05SD005, near Fisherton. In 2018, 12 samples were collected between April 23rd and October 9th.

	2017	2018
Discharge peaked:	March 31st	April 24th
Greatest phosphorus concentration:	702 µg/L* (March 29th)	437 µg/L (April 23rd)
Total phosphorus load:	7 tonnes	1.4 tonnes
Total water load:	0.041 km^3	0.008 km^3
Phosphorus export:	0.11 kg/ha/y	0.02 kg/ha/y
Percent water load in spring:**	82%	80%
Percent phosphorus load in spring:	92%	93%

*The "µg" symbol is used to express micrograms

** Spring is considered to be March 1st to May 31st

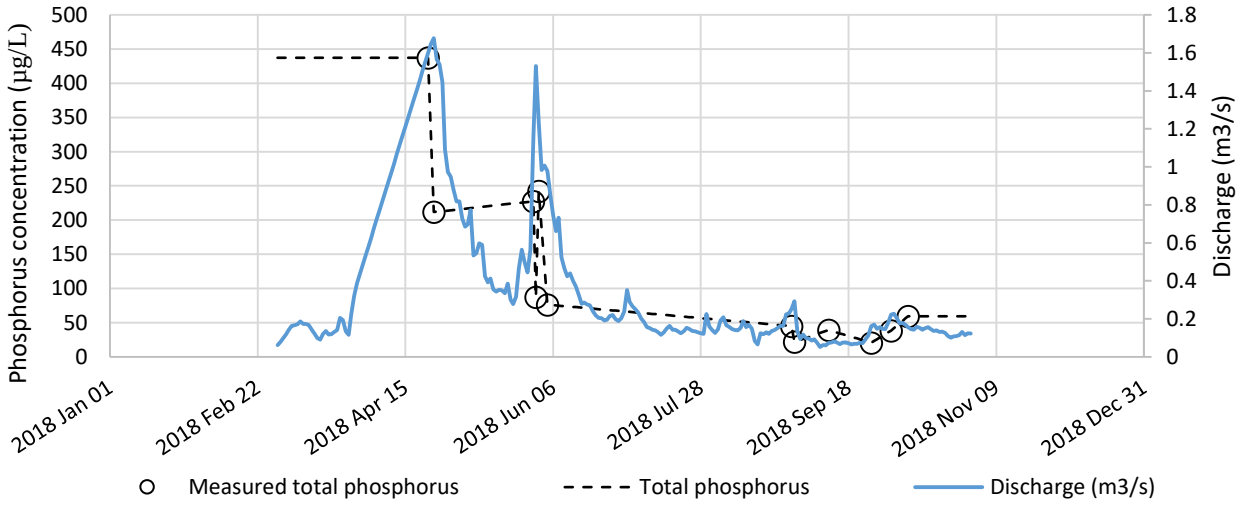


Figure 4. Discharge and total phosphorus concentration over the 2018 sampling season at Fisher River near Fisherton (Water Survey of Canada Station 05SD005).

Icelandic River near Riverton

The Icelandic River watershed, a sub-watershed of the Icelandic River-Washow Bay Creek watershed, is located on the western side of Lake Winnipeg. The Icelandic River sample site drains an area of approximately 1,240 km^2 and flows easterly towards Lake Winnipeg. The main land use within the Icelandic River watershed is agriculture, more specifically, pasture, crops and hay (Icelandic River and Washow Bay Creek Integrated Watershed Management Plan, 2008).

This sample site is located at Water Survey of Canada flow meter 05SC002, near Riverton. In 2018, 23 samples were collected between April 23rd and September 18th.

	2017	2018
Discharge peaked:	March 31st[st]	April 22[nd]
Greatest phosphorus concentration:	697 µg/L measured on March 29th	419 µg/L measured on April 23rd
Total phosphorus load:	41 tonnes	3.7 tonnes
Total water load:	0.104 km^3	0.012 km^3
Phosphorus export:	0.33 kg/ha/y	0.03 kg/ha/y
Percent water load in spring:	96%	78%
Percent phosphorus load in spring:	100%	96%

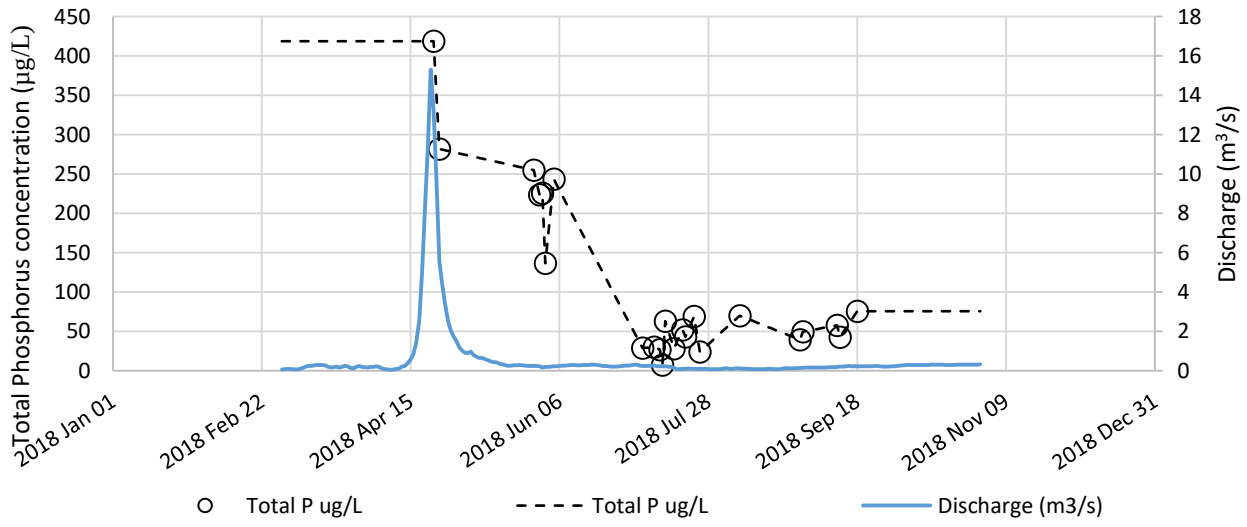


Figure 5. Discharge and total phosphorus concentration over the 2017 sampling season at Icelandic River near Riverton (Water Survey of Canada Station 05SC002).

Netley Creek near Petersfield

Netley Creek is part of the larger Netley-Grassmere watershed. The Netley Creek portion of the watershed is located on the western side of the Red River just below Lake Winnipeg and drains easterly. The drainage area, which is 641 km^2, includes the Rural Municipality of Teulon and Winnipeg Beach, as well as high-quality crop land (Netley-Grassmere Integrated Watershed Management Plan, 2008).

The Netley Creek sample site is located at Water Survey of Canada flow meter 05OJ008, west of Petersfield. In 2018, 23 samples were collected between April 18th and October 12th.

	2017	2018
Discharge peaked:	March 31st	April 20th
Greatest phosphorus concentration:	663 µg/L (March 30th)	393 µg/L (May 28th)
Total phosphorus load:	15 tonnes	1.1 tonnes
Total water load:	0.041 km^3	0.005 km^3
Phosphorus export:	0.23 kg/ha/y	0.02 kg/ha/y
Percent water load in spring:	97%	64%
Percent phosphorus load in spring:	100%	83%

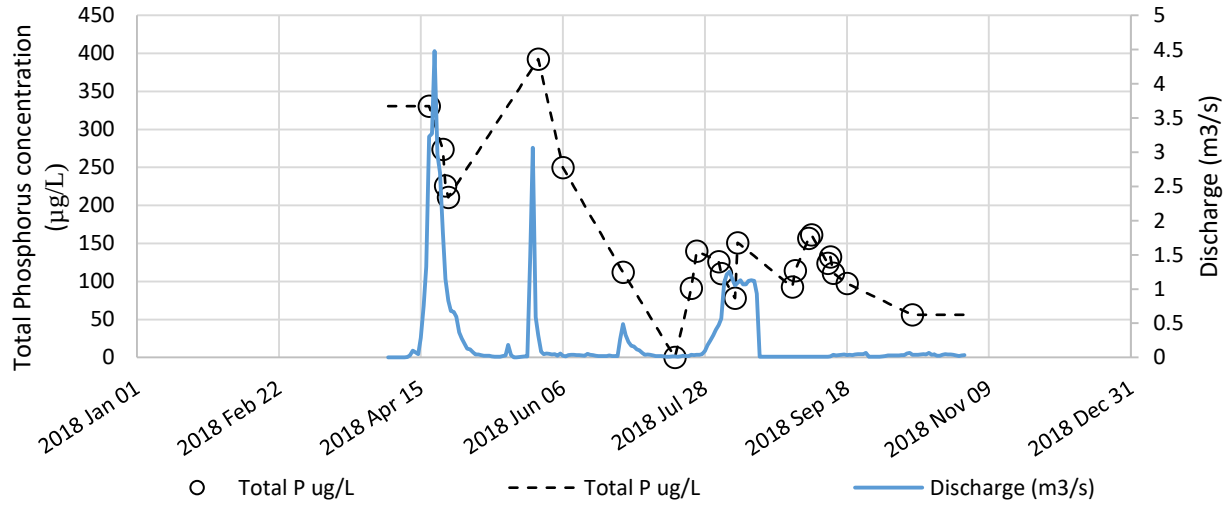


Figure 6. Discharge and total phosphorus concentration over the 2018 sampling season at Netley Creek near Petersfield (Water Survey of Canada Station 05OJ008).

Grassmere Creek near Middlechurch

Grassmere Creek is part of the larger Netley-Grassmere watershed. The Grassmere Creek portion of the watershed is situated north of the city of Winnipeg. The drain begins by flowing southerly but turns to flow easterly once approaching Winnipeg. The drainage area for this sample site is approximately 462 km^2 and drains a portion of the city of Winnipeg, Rural Municipality of Stonewall, and high-quality crop land used for both annual and specialty crop production (Netley-Grassmere Integrated Watershed Management Plan, 2008).

Samples were taken at Water Survey of Canada flow meter 05OJ017 located near Middlechurch. In 2018, 17 samples were collected between April 23rd and October 29th.

	2017	2018
Discharge peaked:	April 1st	April 21st
Greatest phosphorus concentration:	786 µg/L (March 27th)	1684 µg/L (July 5th)
Total phosphorus load:	12 tonnes	1.3 tonnes
Total water load:	0.02 km^3	0.003 km^3
Phosphorus export:	0.27 kg/ha/y	0.03 kg/ha/y
Percent water load in spring:	95%	86%
Percent phosphorus load in spring:	98%	78%

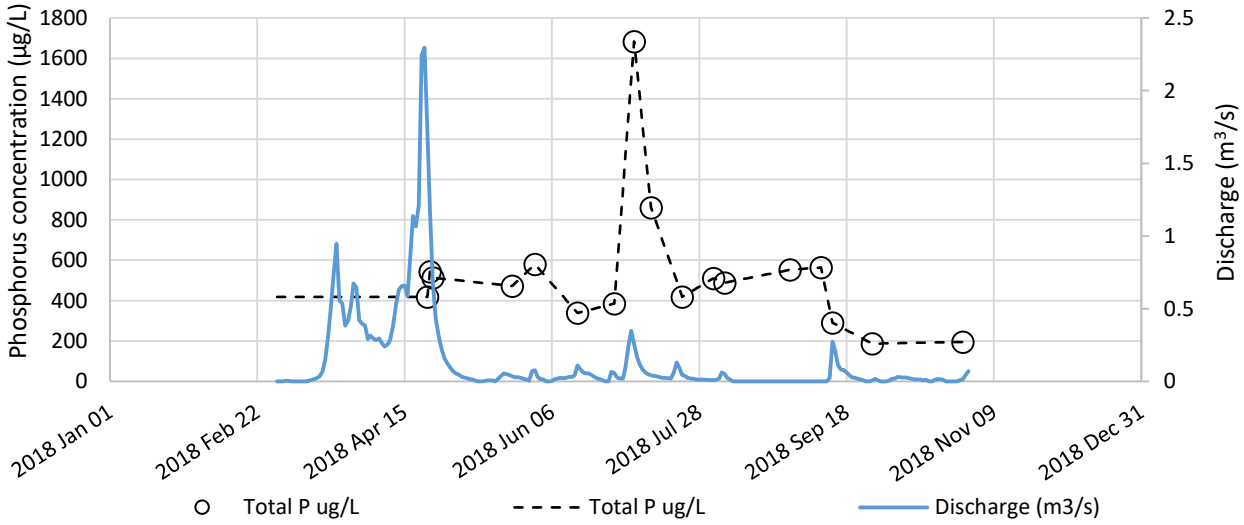


Figure 7. Discharge and total phosphorus concentration over the 2018 sampling season at Grassmere Creek Drain near Middlechurch (Water Survey of Canada Station 05OJ017).

INTERESTED IN SAMPLING WITH LWCBMN?

LWCBMN provides hands-on opportunities for citizens to get involved in water sampling activities. We are looking for volunteers to sample at Water Survey of Canada stations in 2019. You can find a map of potential sites **here**.

If you are interested in sampling, please contact the LWCBMN program manager at **cbm@lakewinnipegfoundation.org**. Together, we can choose a sample site near where you live, work or commute and begin collecting valuable information to measure phosphorus loading to local waterways.

THANK YOU TO OUR 2018 FUNDERS

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Canada

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